AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

1-35 (Canceled)

36 (New) An aberration compensating optical element comprising:

a single lens,

wherein the single lens has:

(i) a first optical surface having a diffractive structure having a plurality of ring-shaped zone steps formed on a plane surface; and

(ii) a second optical surface opposite to the first optical surface, the second optical surface having a concave refractive surface.

37 (New) The aberration compensating optical element of claim 36, wherein the single lens satisfies the following relation;

$P_{\lambda 1} < P_{\lambda 0} < P_{\lambda 2}$

wherein $P_{\lambda 0}$ represents a paraxial power (mm^{-1}) of the single lens at a wavelength λ_0 of a light flux, which passes through the single lens; $P_{\lambda 1}$ represents a paraxial power (mm^{-1}) of the single lens at a wavelength λ_1, which is 10 nm shorter than the wavelength λ_0; and $P_{\lambda 2}$ represents a paraxial power (mm^{-1}) of the single lens at a wavelength λ_2, which is 10 nm longer than the wavelength λ_0.

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38 (New) The aberration compensating optical element of claim 36, wherein at least one ring-shaped zone step having a step distance Δ (mm) in a direction of an optical axis between adjacent steps of the plurality of ring-shaped zone steps is formed within an effective diameter so that m, defined by the following equations, becomes an integer except 0 and ± 1:

$$m = INT(Y),$$

$$Y = \Delta \times (n-1) / (\lambda_0 \times 10^{-3}),$$

wherein INT(Y) is an integer obtained by rounding Y; λ_0 is the wavelength (nm) of a light flux, which passes through the single lens; and n is a refractive index of the single lens at the wave length λ_0 (nm).

39 (New) The aberration compensating optical element of claim 36, wherein the single lens satisfies the following relation:

$$0.5 \times 10^{-2} < P_D < 15.0 \times 10^{-2},$$

wherein P_D is a paraxial power (mm^{-1}) of the diffractive structure and is defined by the following equation:

$$P_D = \Sigma(-2 \cdot b_2 \cdot n),$$

when an optical path difference Φb, which is added to a wavefront transmitting through the single lens by the diffractive structure formed on the first optical surface of the single lens, is defined by the following wavefront transmitting function:

$$\Phi b = n \cdot (b_2 \cdot h^2 + b_4 \cdot h^4 + b_6 \cdot h^6 + \cdots),$$

wherein h (mm) is a height from the optical axis; each of b2, b4, b6 ··· is a second, fourth, sixth order coefficient of the optical path difference function, respectively; and n is a

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diffraction order of a diffracted light having a maximum diffracted light amount among a plurality of diffracted lights generated by the diffractive structure formed on the first optical surface of the single lens.

40 (New) The aberration compensating optical element of claim 39, wherein the single lens satisfies the following relation:

$1.0 \times 10^{-2} < P_D < 10.0 \times 10^{-2}$.

41 (New) The aberration compensating optical element of claim 36, wherein the single lens satisfies the following relations:

$P_D > 0$,

$P_R < 0$, and

$-0.9 < P_D/P_R < -1.1$,

wherein P_D is a paraxial power (mm^{-1}) of the diffractive structure and is defined by the following equation:

$P_D = \Sigma(-2 \cdot b_2 \cdot n)$,

when an optical path difference Φb, which is added to a wavefront transmitting through the single lens by the diffractive structure formed on the first optical surface of the single lens, is defined by the following wavefront transmitting function,

$\Phi b = n \cdot (b_2 \cdot h^2 + b_4 \cdot h^4 + b_6 \cdot h^6 + \cdots)$,

wherein h (mm) is a height from the optical axis; each of b_2, b_4, b_6 $\cdots$ is a second, forth, sixth order coefficient of the optical path difference function, respectively; and n is a

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diffraction order of a diffracted light having a maximum diffracted light amount among a plurality of diffracted lights generated by the diffractive structure formed on the first optical surface of the single lens, and PR is a refractive power (mm^{-1}) of the single lens as a refractive lens.

42 (New) The aberration compensating optical element of claim 36, wherein a paraxial power $P_{\lambda 0}$ (mm^{-1}) of the single lens is substantially zero at the wavelength λ_0 of a light flux, which passes through the single lens.

43 (New) The aberration compensating optical element of claim 36, wherein when a wavelength of a light flux entering the diffractive structure is not more than 550 nm, a diffraction efficiency of the diffractive structure becomes maximal.

44 (New) The aberration compensating optical element of claim 36, wherein the single lens is a plastic lens.

45 (New) The aberration compensating optical element of claim 36, wherein the diffractive structure has such a spherical aberration property that a spherical aberration of an emergent light flux is changed in an under-corrected direction or an over-corrected direction when a wavelength of an incident light flux is shifted to a longer wavelength side, and

wherein the diffractive structure is formed so as to satisfy the following relation,

$$0.2 \leqq |(P_{hf}/P_{hm})-2| \leqq 6.0$$

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wherein P_{hf} is a first interval in a direction to perpendicular to an optical axis of the diffractive structure between adjacent steps of the ring-shaped zones of the diffractive structure at a diameter hf, which is a half of a maximum effective diameter hm, and P_{hm} is a second interval in the direction to perpendicular to the optical axis of the diffractive structure between adjacent steps of the ring-shaped zones of the diffractive structure at the maximum effective diameter hm.

46 (New) An aberration compensating optical element comprising:

a single lens, the single lens being a plastic lens having a first optical surface having a diffractive structure having a plurality of ring-shaped zone steps;

wherein the single lens satisfies the following relations,

$P_{T1} < P_{T0} < P_{T2}$

$P_R < 0$

wherein P_{T0} is a paraxial power (mm^{-1}) of the single lens at a predetermined temperature T_0; P_{T1} is a paraxial power (mm^{-1}) of the single lens at a temperature T_1, which is lower than the predetermined temperature T_0; P_{T2} is a paraxial power (mm^{-1}) of the single lens at a temperature T_2, which is higher than the predetermined temperature T_0; and P_R is a refractive power (mm^{-1}) of the single lens as a refractive lens.

47 (New) The aberration compensating optical element of claim 46, wherein the single lens satisfies the following relation,

$0 < \Delta P_{AC}/\Delta T_{AC} < 1 \times 10^{-4}$

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wherein ΔP_{AC} is an amount of a change in a paraxial power (mm^{-1}) of the single lens, which is caused by the temperature change ΔT_{AC} (°C) of the single lens.

48 (New) The aberration compensating optical element of claim 46, wherein the diffractive structure of the first optical surface is formed on a plane surface, and the single lens further has a second optical surface opposite to the first optical surface, and the second optical surface has a concave refractive surface.

49 (New) The aberration compensating optical element of claim 46, wherein a paraxial power $P_{\lambda 0}$ (mm^{-1}) of the single lens is substantially zero at the wavelength λ_0 of a light flux, which passes through the single lens.

50 (New) The aberration compensating optical element of claim 46, wherein at least one ring-shaped zone step having a step distance Δ (mm) in a direction of an optical axis between adjacent steps of the plurality of ring-shaped zone steps is formed within an effective diameter so that m, defined by the following equations, becomes an integer except 0 and ± 1:

$$m = INT(Y),$$

$$Y = \Delta \times (n-1) / (\lambda_0 \times 10^{-3}),$$

wherein INT(Y) is an integer obtained by rounding Y; λ_0 is the wavelength (nm) of a light flux, which passes through the single lens; and n is a refractive index of the single lens at the wave length λ_0 (nm).

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51 (New) The aberration compensating optical element of claim 46, wherein the diffractive structure has such a spherical aberration property that a spherical aberration of an emergent light flux is changed in an under-corrected direction or an over-corrected direction when a wavelength of an incident light flux is shifted to a longer wavelength side, and

wherein the diffractive structure is formed so as to satisfy the following relation,

$0.2 \leqq |(P_{hf}/P_{hm})-2| \leqq 6.0$

wherein P_{hf} is a first interval in a direction to perpendicular to an optical axis of the diffractive structure between adjacent steps of the ring-shaped zones of the diffractive structure at a diameter hf, which is a half of a maximum effective diameter hm, and P_{hm} is a second interval in the direction to perpendicular to the optical axis of the diffractive structure between adjacent steps of the ring-shaped zones of the diffractive structure at the maximum effective diameter hm.

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